

State of New Jersey
Department of Environmental Protection



Division of Air Quality

**TECHNICAL
MANUAL
1301**

**BATCH PRODUCTION
PLANTS**

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Table of Contents

I.	Definitions	2
II.	Introduction	3
III.	Applicability.....	3
IV.	Raw Materials List	4
V.	Air Flow Diagram.....	4
VI.	Batch Plant Permitting Procedure.....	5
	A. Application Format	
	B. State-of-the-art Requirements	
	C. Dual Plants Permits	
	D. Health Risk Assessment	
	E. Potential To Emit (PTE)	
	F. Emission Calculations Methodology	
	G. Netting Analysis	
	H. Continuous Operation & Batch Plant Applications	
	I. Administrative Completeness	
	J. Permit Modifications	

Appendix I Health Risk Assessment Procedure

I. DEFINITIONS

Terms used in this manual are defined in N.J.A.C. 7:27-8, N.J.A.C. 7:27-16, and N.J.A.C. 7:27-22 and as follows:

Batch Plant: Processes in which the feed is charged into the system at the beginning of the process and the products are removed all at once at the end of the process.

Batch Process Operating Scenario (BPOS): A detailed description of equipment relationships for a process line and for each operating step of the batch process.

Batch Process Operating Scenario (BPOS) Step: A description of a particular manufacturing operation or process, such as charging, mixing or heating. The description identifies the relationship of a piece (or set) of equipment, control device (or set) and an emission point (or set). You may describe only one piece (or set) of equipment in a BPOS Set.

Operating Scenario: As defined at N.J.A.C. 7:27-22.1.

Department: New Jersey Department of Environmental Protection

Dual Plant: Facility where the same pieces of equipment are used for both R&D and manufacturing operations.

Major Facility: Any facility subject to N.J.A.C. 7:27-22.

Pilot Plant: Facility used primarily to produce materials for research and development in chemical and pharmaceutical operations, establish improved methods of manufacturing, or gather data in assessing process feasibility.

Pollutants Of Concern (POC): Include all air contaminants listed in the Department's Health Risk Assessment Spreadsheet available at www.state.nj.us/dep/aqpp/risk.html.

Reaction Intermediates: Materials which are created and not isolated as a finished product and are subsequently used as a raw material. Other names could be used if it is clear that the material is the result of a reaction process and not isolated as a final product.

R&D Operation: An operation that performs R&D for similar families of end products and/or processes and is managed and/or operated independently from other R&D operations.

II. INTRODUCTION

1. The purpose of this manual is to define procedural and substantive requirements and provide guidance in the preparation of batch production plant permit applications.
2. Information provided in this manual should be used as reference guidance only. Each permit application is reviewed considering individual characteristics (potential to emit, type and size, location, air quality impacts, etc.) of the proposed equipment and the available air pollution control technology to determine the specific maximum allowable emission rates of air contaminants.
3. N.J.A.C. 7:27-8 and N.J.A.C. 7:27-22 list equipment and source operations that require air pollution control permits from the Department.
4. The Applicant must include all air contaminant emissions, above the reporting thresholds listed in N.J.A.C. 7:27-8 and N.J.A.C. 7:27-22, in the permit application. This includes emissions generated by operations involving cleaning of equipment and/or control devices and emissions generated by control devices such as thermal oxidizing units.
5. During routine inspections by the Regional Office, equipment, control device and emission point identification is necessary. As a condition of Batch plant and dual plant permit approvals, all sources, control devices and emission points (where feasible) must be marked with easily readable designations or noted on appropriate diagrams. These designations must correspond to the information provided on inventories and diagrams, as provided in the permit application. Emission points must be identified on the roof. These diagrams must be maintained on site and be made available upon the request of the Department.
6. The Department requires facilities to submit air pollution control permit applications using RADIUS as well as additional information outlined in this procedure.
7. This manual outlines the permit application process. The manual is not a mechanism to address the permit review process. The format and content of existing permits will not be affected by this manual.

III. APPLICABILITY

1. Batch plant equipment and source operations may be included in a Batch plant air pollution control permit application if:

- a) The Batch plant equipment and source operations require air pollution control permits as specified in N.J.A.C. 7:27-8 and N.J.A.C. 7:27-22.
 - b) All equipment is in a logical grouping such as a room, building or a common area.
 - c) Equipment at the plant is configured and operated in a manner that meets the definition of Batch plant or dual plant.
 - d) Equipment is not being used in a continuous process. (See VI, H for exceptions.)
2. Permit applications not meeting the definition of “Batch Plant” or “Batch Process”, as outlined in this manual, will not be eligible for a Batch plant permit.

IV. RAW MATERIALS LIST

1. The application shall include all raw materials regardless of the proposed emission rates, including reaction intermediates, that will be used in any piece of equipment listed in the “Equipment Inventory”, consistent with N.J.A.C. 7:27-8 and N.J.A.C. 7:27-22. The raw materials shall be listed alphabetically or in CAS number sequence and not by process or operating scenario.
2. In the situation where the raw material is all natural the Department will accept statements such as “All Natural Apple Extract”, “Oregano” or “Banana Extract” (the word “Extract” meaning all natural materials with no additives). The CAS number, when one exists, should be provided for these materials.

V. AIR FLOW DIAGRAM

1. An air emissions flow diagram shall be provided for each batch operating scenario included in the application. The diagram should be a simple block diagram showing the flow of air emissions from the pieces of equipment (or sets of pieces of equipment) to the atmosphere. Air pollution control equipment and emission points shall be represented as well.
2. All pieces of equipment (and/or set), control devices (and/or set), and emission points (and/or set) included in the application must be clearly identified using the NJID# used in the inventories (i.e. E101, ES5, CD2, CS3, PT13, PS18).

VI. BATCH PLANT PERMITTING PROCEDURE

A. Application Format

Owners or operators of Batch plants who are seeking to permit their equipment and control device under this permitting procedure must submit an application which contains the following:

1. A statement of the purpose of the Batch plant as well as a description of the different processes.
2. A Batch Plant Air Pollution Control Permit Application in the batch plant format and using the RADIUS software available at <http://www.state.nj.us/dep/aqpp/>. The following guidance is meant to supplement the RADIUS batch plant guidance (<http://www.state.nj.us/dep/aqpp/downloads/forms/instruct.pdf>):
 - a) Similar sources (i.e. reactors) can be combined into one or more equipment sets (Equip. Set ID) if they are interchangeable.
 - b) Similar control devices (i.e. condensers) can be combined into a control device set (CD Set ID) if they are interchangeable. However, only similar control devices with similar design criteria may be part of a set. A set may include only certain size condensers, for example, but not condensers and carbon adsorption drums.
 - c) Stacks (emission points) can be combined into an emission point set (PT Set ID) if they are interchangeable. Any emission point may belong to more than one set. However, if health risk assessment considerations dictate the use of specific emission points for certain air contaminants, those emission points must be included in separate sets. Roof vents or general ventilation systems used for indirect emissions must be included in the inventory.
 - d) The permit application may include one or more batch operations as defined in this manual. Each Batch operation should be represented in the RADIUS permit application by a separate “BP”.
 - e) A batch process may have more than one operating scenario. Each operating scenario shall contain all the steps performed under that scenario. Two or more operating scenario steps may be combined if approved by the Department. Each step must contain the associated equipment numbers or equipment sets, control device numbers or control device sets and emission point numbers or emission point sets.
 - f) The batch step VOC Range (pursuant to N.J.A.C. 7:27-16) must be completed for steps that have VOC emissions.

- g) The Department recommends that applicants request a pre-application meeting with the Department when an applicant requires case-by-case determination for a process that may not fit the above guidelines.
- 3. Inventory detail windows must be completed for each piece of equipment, control device and operating scenario.
- 4. A list of all raw materials.

B. State-of-the-Art (SOTA) Requirements:

- 1. Air pollution control permit applications subject to N.J.A.C. 7:27-8, proposing construction, installation, reconstruction, or modification of equipment and control apparatus which is a significant source and has potential air emission that exceed the SOTA listed in N.J.A.C. 7:27-8, must document state of the art (SOTA) for the source.
- 2. Air pollution control permit applications subject to N.J.A.C. 7:27-22, proposing new construction, reconstruction, or modification of equipment and control apparatus which is a significant source, must incorporate advances in the art of pollution control (SOTA) for the kind and amount of air contaminant emitted by the applicant's equipment and control device pursuant to N.J.A.C. 7:27-22.

C. Dual Plant Permits

- 1. If pilot plant and batch production operations share the same equipment, a dual permit may be obtained. This type of operation requires a two-part air permit application. The two parts, Batch Plant and Pilot Plant, must follow the requirements of their respective guidance manuals (Technical Manual 1301 for Batch Plants and Technical Manual 1302 for Pilot Plants) and must contain all the information required in the manuals. In addition, due to the different requirements between Batch and Pilot operations, separate Raw Materials Lists must be submitted.
- 2. For major sources with an approved Title V Operating Permit, manufacturing operations and R&D may be included in one Title V Operating Permit. Another option is to have the manufacturing operations in the Title V Operating Permit and the R&D operations in a separate preconstruction permit. For all other sources, both manufacturing and R&D operations shall be combined in a single dual permit.

3. Reporting of emissions for the Dual permit will be on the forms provided in Technical Manual 1302
(<http://www.state.nj.us/dep/aqpp/downloads/techman/1302.pdf>).

D. Health Risk Assessment

1. Health risk assessment is a scientific process used to estimate the probability of adverse health effects resulting from human exposure to hazardous substances.
2. Batch plant applications, with potential emissions of any pollutant of concern, per piece of equipment, above reporting thresholds listed in N.J.A.C. 7:27-8, will be required to conduct a health risk assessment analysis for short term (lb/hr or lb/batch-cycle hour) and long term (tons/yr) emissions. The instructions for conducting risk assessment for Batch Plants are outlined in Appendix I.

E. Potential To Emit (PTE):

Proposed potential emissions shall be entered on the Potential to Emit windows in RADIUS as follows:

1. BP OS Summary – Tons per Year: The batch plant emission limits (tons/yr) shall be listed at the batch plant summary level and shall include the annual emissions of all air contaminants for each Batch operation (BP), consistent with N.J.A.C. 7:27-8 and N.J.A.C. 7:27-22.
2. STO Summary – Pound per Batch: The batch emission limits for all air contaminants representing the worst case total in any batch (lb/batch), for each operating scenario, shall be listed at the step summary in the permit application.
3. ST – Pound per Step: The step emission limits for all air contaminants representing the worst case total in any step (lb/step), for each step, shall be listed at the step level (ST) in the permit application.
4. Emission limits are not required for air contaminants when the emissions, per source operation, are below the N.J.A.C. 7:27-8 and N.J.A.C. 7:27-22 reporting thresholds.
5. Batch Step Hourly Emission Rate:
Facilities that are required to demonstrate compliance with the pound per hour emission limits in N.J.A.C. 7:27-6, 7 and 16 and for Risk Screening shall calculate the emissions as follows:

For each batch step, hourly emissions shall be calculated by dividing the emission limit for each air contaminant listed as lb/step by the minimum step time (hours). If the step time is less than one hour divide the emission limit by one hour. This information can be supplied outside of RADIUS or in RADIUS in the ST Section.

6. VOC Batch Cycle Hourly Emission Rate:

Facilities that use batch cycle hourly emission rate to demonstrate compliance with the allowable emission rates in N.J.A.C. 7:27-16, shall calculate the emissions as follows:

- a) The VOC batch cycle emission rate (as defined in N.J.A.C. 7:27-16.1) shall be used to determine compliance with N.J.A.C. 7:27-16.
- b) For equipment set used in a single batch step of an operating scenario, the batch step hourly emission rate shall be as calculated above.
- c) For equipment set used in more than one batch step of an operating scenario, the batch step hourly emission rate shall be calculated by dividing total emissions from those steps by the sum of step times used to calculate the batch step hourly emissions.
- d) This information can be supplied outside of RADIUS or in RADIUS in the ST Section.

F. Emissions Calculations Methodology:

1. Air contaminant emissions listed in the permit application shall be determined using an acceptable methodology, combining raw materials usage and other operational parameters.
2. The emission calculation methods listed below can be used for the PTE calculations.
 - a) Data from continuous emission monitor systems
 - b) Data from stack emission testing
 - c) Material Balance
 - d) Engineering calculations
 - e) Emission factors
3. The following websites are good references for emission calculations:
http://www.epa.gov/ttn/chief/eiip/techreport/volume02/ii16_aug2007final.pdf and
<http://www.mitchellscientific.com/EmissionMaster.htm>

G. Netting Analysis

The applicant shall determine whether the maximum allowable emissions proposed in an application for a permit would result in a significant net emission increase, pursuant to N.J.A.C. 7:27-18. Air emissions from the entire facility must be taken into account.

H. Continuous Operation & Batch Plant Applications

Continuously operating equipment venting through control devices that are used by the batch plant sources shall be included in the batch plant permit application. The method of inclusion of the operating scenario for this piece of equipment shall be done by the Department on a case-by-case basis.

I. Administrative Completeness for Facilities Subject to N.J.A.C. 7:27-22

1. Major facilities must submit applications that are “Administratively Complete” pursuant to N.J.A.C. 7:27-22.6 (Initial Operating Permits), N.J.A.C. 7:27-22.23 (Minor Modifications) and N.J.A.C. 7:22.24 (Significant Modifications), before a technical review of the application begins.
2. Administrative completeness check lists are available upon request. Some of the requirements for administrative completeness that are overlooked in the preparation of the application are:
 - a) Proposed compliance plan meeting the requirements of N.J.A.C. 7:27-22.9.
 - b) Operating parameters that have an impact on emissions.

J. Permit Modifications

1. Applications for permit modifications shall be consistent with N.J.A.C. 7:27-8 (non-major facilities) and N.J.A.C. 7:27-22 (major facilities).
2. All permit changes pursuant to N.J.A.C. 7:27-8.17 and N.J.A.C. 7:27-22.20 through 25 must follow this new procedure. This shall include modifications to permits issued using other permitting procedures. This procedure supersedes all other procedures used to apply for a Batch Plant permit application.

APPENDIX I

HEALTH RISK ASSESSMENT PROCEDURE FOR BATCH PLANTS

STEP 1:

- a) Use the Health Risk Screening Worksheet (available at www.state.nj.us/dep/aqpp/risk.html) to calculate the Total Cancer Risk (TCR), the Total Health Index (THI) and the Total Short-term Health Index (TSHI) as follows:
- b) For TCR and THI calculations, use the annual emissions in tons per year (from the BP OS Summary), the shortest stack height and the shortest distance to the property line (both from the PT inventory).
- c) For TSHI calculation, calculate the hourly emissions in pounds per hour using the lb/step from the BP OS ST and the minimum step time, for each step in each operating scenario. This hourly emission rate shall correspond to the batch step that causes the highest TSHI.
- d) If $TCR \leq 1.0E-6$ (one in a million)¹, THI and TSHI are both ≤ 1.5 , the health risk assessment is acceptable. If not, you may revise your permit application to:
 - 1) Direct the most toxic pollutants to taller stacks,
 - 2) Limit most toxic pollutant emissions to buildings more distant from the property line, or
 - 3) Reduce batch size and/or number of batches to curtail emissions.
- e) Rerun the risk assessment using the revised information. If $TCR \leq 1.0E-6$ ¹, THI and TSHI are both ≤ 1.5 , the health risk assessment is acceptable. If not, proceed to Step 2 below.

STEP 2:

Prepare a site-specific health risk assessment following a protocol approved by the Department's Bureau of Technical Services. At this step, information related to stack gas temperature, distance to nearest residents and other sensitive receptors, use of multiple stacks, and proximity to complex terrain, along with other local parameters will be considered to refine the air dispersion model and health risk assessment. If $TCR \leq 1.0E-5$, THI and TSHI are both ≤ 1.5 , the health risk assessment is acceptable.

¹ **TCR $\leq 1.0E-5$ if the batch plant operation is the sole source operation at the site.**